

CLAIMS

We claim:

- 1 1. A method of automatic gain control on a time slot by time slot basis in a
2 receiver module of a base transceiver station employed in a communication system
3 having a plurality of time slots within a time frame, comprising the steps of:
4 2. measuring an amplitude of a signal on a given time slot among the
5 plurality of time slots for a predetermined number of prior time frames to provide at
6 least one amplitude value per given time slot;
7 3. storing the at least one amplitude value and associated time slot
information and determining an appropriate gain adjustment factor for the given
time slot; and
8 4. applying the gain adjustment factor to at least one received signal in a
current time slot of the given time slot, wherein a respective gain adjustment factor
for each given time slot is applied to a plurality of current time slots within the time
frame on a time slot by time slot basis.

- 1 2. The method of claim 1, wherein the step of measuring further comprises the
2 step of measuring the amplitude of a plurality of signals on a given time slot.

- 1 3. The method of claim 2, wherein the step of applying the gain
2 adjustment factor further comprises the step of applying a respective gain

3 adjustment factor for each given time slot across a plurality of radio frequency
4 carriers occupying each given timeslot.

1 4. The method of claim 3, wherein the method further comprises the
2 step of adjusting the gain during a guard period between the plurality of time slots
3 to avoid modifying attenuation devices in a receive path of the receiver which may
4 corrupt data on the plurality of radio frequency carriers in a given time slot and
5 thereby corrupt information.

5. The method of claim 1, wherein the method further comprises the
step of immediately attenuating high strength signals upon initial receipt and
detection of the high strength signals notwithstanding the gain adjustment factor
in spite of
that may have been applied. ↗

6. The method of claim 1, wherein the method further comprises the
2 step of maintaining the automatic gain control synchronous with a time slot burst.

1 7. The method of claim 1, wherein the method further comprises the
2 step of informing a base station transceiver of attenuation occurring on a given
3 time slot to help obviate a base station request to reduce power for other strong RF
4 carriers using the same time slot. ↗

1 8. The method of claim 1, wherein the method further comprise the step
2 of applying attenuation based on a higher gain detected in a diversity condition. ¹⁶⁵

1 9. The method of claim 1, wherein the step of applying a gain
2 adjustment factor comprises the step of adjusting an attenuator with reference to
3 the burst timing of a received signal on the given time slot.

1 10. A method for controlling the amplitude of at least one currently
2 received TDMA signal in a receiver module of a base transceiver station (BTS)
3 employed in a time-division multiple access (TDMA) communication system, said
4 TDMA system having a plurality of time slots; the method comprising:

5 ¹⁵⁵storing amplitude values and associated time slot information determined
6 from at least one previously received TDMA signal, said at least one previously
7 received TDMA signal arriving during at least one earlier frame;

8 determining from said stored amplitude values and associated time slot
9 information an appropriate gain adjustment factor for each of said plurality of time
10 slots;

11 detecting said at least one currently received TDMA signal; and applying
12 respective ones of said appropriate gain adjustment factors to respective ones of
13 said at least one currently received TDMA signals, wherein said appropriate gain
14 adjustment factors are applied exclusively to said currently received TDMA signals

15 occupying respective ones of said plurality of time slots.

1 11. The method for controlling the amplitude of received TDMA signals of
2 claim 10, wherein said gain adjustment factors are applied during a guard period of
3 said at least one currently received TDMA signal.

1 12. The method for controlling the amplitude of received TDMA signals of
2 claim 11, wherein GPS timing information is provided to said system to time
3 synchronize application of said gain adjustment factors to said guard periods.

1 13. The method for controlling the amplitude of received TDMA signals of
2 claim 10, further comprising the step of supplying the appropriate gain adjustment
3 factors to a signal processor responsible for determining a received signal strength
4 (RSSI) for each of the least one currently received TDMA signal, (whereby the BTS
5 may consider the gain adjustment factors in determining a signal power for a
6 transmitting mobile to use.)

1 14. The method for controlling the amplitude of received TDMA signals of
2 claim 10, wherein the step of detecting further comprises comparing an amplitude
3 of the at least one currently received TDMA signal to a predetermined saturation
4 threshold.

1 15. The method for controlling the amplitude of received TDMA signals of
2 claim 14, further comprising the step of applying an attenuation factor during a
3 time slot of the at least one currently received TDMA signal if an amplitude of the
4 at least one currently received TDMA signal exceeds the predetermined saturation
5 threshold.

1 16. The method for controlling the amplitude of received TDMA signals of
2 claim 10, wherein the appropriate gain adjustment factors are determined by
3 averaging amplitudes of the at least one previously received TDMA signal arriving
4 during the at least one earlier frame.

1 17. The method for controlling the amplitude of received TDMA signals of
2 claim 16, wherein IF envelope power values constitute the amplitudes of the at
3 least one previously received TDMA signal arriving during the at least one earlier
4 frame.

1 18. The method for controlling the amplitude of received TDMA signals of
2 claim 10, wherein said BTS is a broadband BTS providing cellular service using a
3 plurality of RF carriers, further comprising applying respective ones of said
4 appropriate gain adjustment factors to said at least one currently received TDMA

5 signals occupying said plurality of RF carriers on said respective time slot.

1 19. An apparatus for controlling the amplitude of at least one currently
2 received TDMA signal in a receiver module of a base transceiver station (BTS)
3 employed in a time-division multiple access (TDMA) communication system, said
4 TDMA system having a plurality of time slots, comprising:

5 a receiver within the receiver module for receiving TDMA signals;

6 a memory coupled to the receiver for storing amplitude values and
7 associated time slot information determined from at least one previously received
8 TDMA signal, the at least one previously received TDMA signal arriving during at
9 least one earlier frame; and

10 a processor coupled to the memory and the receiver and further being
11 programmed to determine from the stored amplitude values and associated time
12 slot information an appropriate gain adjustment factor for each of said plurality of
13 time slots, to detect at least one currently received TDMA signal, and to apply
14 respective ones of the appropriate gain adjustment factors to respective ones of
15 the at least one currently received TDMA signals, wherein the appropriate gain
16 adjustment factors are applied exclusively to the currently received TDMA signals
17 occupying respective ones of said plurality of time slots.

- 1 (20) The apparatus of claim 19, wherein the TDMA signals are synchronized
- 2 to GPS timing for time slot bursts of RF carriers.